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Robert Charles McCord

RCMCCORD.LTR
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6220 Burton Street
R mulus, Michigan 48174-4222
Fax: 734-595-6473
rmccord180437MI@comcast.net
Phone: 734-595-8957
www.multivexmirr r.c m

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Inventor: Robert C. McCord
Art Unit: 2872

Title: Vehicle mirrors and related molds whereon the reflective surface is developed by a two-eye method involving the aniseikonia ratio ZETA of the left & right eye apparent image size pairs

Date of 1st Office Action: 07/02/2002
Examiner: Ricky D. Shafer

This response is respectfully submitted to Examiner R. D. Shafer:

The Inventor, with prejudice, elects the species casually identified by the Examiner in paragraph < 1. B). The species depicted by Fig. 1 >.

The concept of this invention is to develope an automotive mirror reflective surface geometry, based upon focusing the vehicle operator's two eyes simultaneously upon a moving target (usually another vehicle) having continuously changing lateral and longitudinal distance from the mirror. A further objective is that all claims will apply equally as well to any type of vehicle, and it's mirrors; whether it be an INDY-TYPE RACE CAR having mirror sizes about 2" x 4", or to HEAVY TRUCK & BUS mirrors which are in the range of 10" square or larger, and which also may have round, rectangular, or other shaped mirror faces.

This concept is comprised of TWO CONDITIONS, namely: 1) a PRINCIPAL CONDITION, and 2) a DEPENDENT CONDITION. The Principal Condition (1) is the use of the operators two eyes to develop the optical surface of the mirror. The Dependent Condition (2) involves identifying a suitable series of focus points for the two-eyes lines-of-sight from the mirror's surface. The Inventor is unaware of any prior art relating to this concept.

PRINCIPAL CONDITION (1) is easy to understand, since most people have two functional eyes, which they automatically focus upon an object of interest (just as a camera is focused when taking a photograph). In both cases, those objects that are "out of focus" will appear "fuzzy or blurred". The more out of focus, the more fuzzy will the object appear. Therefore, an objective of this invention is to minimize the fuzziness of objects-of-interest, while expanding the field-of-view to minimize or eliminate mirror "blind spots" relative to the vehicle operator; conceding that the rest of the world in the mirror's field-of-view will be out-of-focus to one degree or another, depending upon it's distance from the mirror's surface.

DEPENDENT CONDITION (2) is much more difficult to understand or define. The exact geometric characteristics, length, location, and attitude, of the focus line will vary with various application engineers (depending upon their experience and objectives). For OEM (new vehicle applications), it is conceivable that each vehicle (or at least size class of vehicles) will have it's/their own very best version of this invention's concepts. For aftermarket applications, more generalization of vehicle types and sizes would be averaged into several size and shape classifications.

There are many variables to be considered in the concept and design of this type mirror. The exact optical configuration of the mirror's surface will vary somewhat with selection of each variable. Some of the variables are simply a function of the vehicle application. Other variables are a function of the mirror designer's experience and/or intuition. Some variables would be selected based upon trial and testing (using computer models and actual vehicle/people testing). Aspheric mirror's, of this type, will always require various educated compromises by the designer. I make these statements as an engineer, and aspheric mirror designer, with probably more real automotive applications than any other person in the world.

Some of the variables that must be carefully considered for application of this concept are:

* Size and location of the principal vehicle in it's traveling lane.
* Size and location of a target vehicle in an adjacent lane.
* Mirror size and location on the principal vehicle.
* The portion of the mirror dedicated to spherical vrs aspherical optical geometries.
* Width dimension of the highway lanes.
* Total field-of-view requirements for a specific application.
* Lateral, longitudinal, and oblique distances from the mirror's surface to a multiplicity of points along the selected focus line, which may have any geometric configuration deemed necessary for general or specific applications.
* The choice of focusing on the front of a trailing vehicle, or along it's side, or elsewhere.
* The center distance between the eyes of the vehicle operator (usually taken as a ninety percentile average of vehicle operators).
* Average distance from the operator"s eyes to the mirror's surface.

Figures (1.) and (3.) make no attempt to specifically define focus lines, but are generalizations of their geometric characteristics, length, location, and attitude relative to the various vehicles and highway dimensions.

Figures (5A thru 5F) cannot each represent different species of this invention. They simply depict identical mirror face optical geometries contained within various mirror face borders. Various mirror face optical geometries, as dictated by the mirror face size and shape for a given application and consistent with the scope and intent of this invention, will become necessary from time to time.

The Figure 6 concept employs the generic optical geometry concept of this invention across and above the horizontal datum line of the mirror; while developing a compressed version of the same geometry by rotating the horizontal geometry downward through up to ninety-degrees to as far as the vertical centerline of the mirror through it's optical design center; during which rotation the incremental slope angles of the mirror's surface, along the horizontal datum line with respect to the mirror's datum in the plane of the paper, are maintained throughout the compressing (fore-shortening of radial rays) rotated portion of the mirror, or said slope angles are also progressively increased.

The Inventor also believes that the concepts disclosed in Figure 3 and in Figure 7 are generic to this invention. Figure 3 employs the two-eye line-of-sight principles of this invention, along with the necessary and unique optional focus lines. The focus lines of Figure 1 and Figure 3, and others not shown or described, may be employed optionally in any of these applications, without violating the intent of this invention.

In the case of both Figure 3 and Figure 7, the well described features and concepts of this invention are developed as left hand and right hand versions, and are then merged at their optical design centers to become full panoramic rear-view mirrors. No new materials or processes are introduced.

Clain 9 applies to Figure 3 and Figure 7, but is also generic to the concepts of this invention.

The Inventor believes that all claims disclosed in this invention application are generic.

Respectfully submitted by,

Robert C. McCord, Inventor AUG 1, 2007
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